WEATHER, FORECASTS, AND WARNINGS.

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Alaska.—Pressure averaged above normal over central and eastern portions and below over the western portion. It was relatively low during the first decade and during the last five days of the month, while at other times it was almost continuously above the seasonal average. Lows occurred about the 2d–3d, 5th–6th, 8th–9th, 13th, 16th–17th, 26th–27th, 28th–29th, and 30th–31st; and highs about the 3d–4th, 12th, 15th, 19th, 22d and 24th.

Honolulu.—Pressure for the month averaged above normal. Lows occurred on the 9th–10th, 14th, and 23d–24th; and highs on the 3d, 12th, 18th–19th and from the 25th to 30th.

Iceland.—Pressure over this area averaged about 0.40 inch below the normal. Lows occurred on the 1st–2d, 3d, 5th, 10th, 12th, 14th, 19th–20th, 25th, 27th, and 30th–31st; and highs on the 8th, 11th–12th, 13th, 17th, 23d, 26th–27th, and 28th–29th. The principal low of the month occurred on the 5th when a barometer reading of 28.08 inches was reported. Pressure was below 29 inches from the 3d to 6th and on the 14th.

Azores.—The excess in pressure at Horta averaged more than 0.10 inch. Pressure was continuously high except on the 2d and from the 26th to 29th. Lows occurred on the 2d, 19th–20th, 21st–22d, 26th–27th, and on the 28th; and highs on the 1st, 9th, 12th–13th, 15th–16th, 20th–21st, 23d–24th, and 31st.

Siberia.—Pressure averaged below normal over eastern and above over western portion. During the last week of the month pressure was low over the whole of this area. Lows occurred about the 11th, 17th, 24th, 27th, and 29th; and highs about the 3d and 21st. At other times no general high or low was traceable across this region.

Miscellaneous.—A press report from Hamburg, Germany, states that 80 ships, mainly small craft, were sunk off that city during the early morning of the 18th, in a southwest storm. From the 18th to the 23d the British Isles were visited by gales.

WEATHER IN THE UNITED STATES.

The month opened with pressure high off the Atlantic coast, over the west Gulf States, Alberta, Canada, and the western Plateau, while lower pressure prevailed over southwestern Minnesota and Lake Erie, from which latter region a trough extended to the east Gulf States.

By the morning of the 2d the Minnesota disturbance had passed northeastward to Ontario, while the Lake Erie center was over the Canadian Maritime Provinces. High winds occurred on the lower Lakes, and on the 2d small-craft warnings were ordered for the Atlantic coast from Cape May northward, and brisk to high winds occurred along the middle Atlantic and New England coasts during the afternoon. By the morning of the 4th the storm had passed from the field of observation.

On the 1st, cold-wave warnings were issued for eastern Minnesota, Iowa, Wisconsin, northern Illinois, portions of Missouri and Nebraska, Michigan, and northern Indiana, and decided changes to colder weather occurred over the States indicated. Frost warnings were issued on the following morning for Mississippi, Alabama, Georgia, northern Florida, and the Carolinas, and frosts occurred substantially as forecast. The Alberta high passed southwestward with increased intensity accompanied by extremely low temperatures for the season, and on the morning of the 2d its center was over Arkansas, frosts being reported in portions of the east Gulf States and freezing temperatures occurred in Texas, except along the coast. Minimum temperatures ranged from 15° below zero in Kansas to 35° below in northern Minnesota, and they were 2° to 5° below any previous March record at numerous points in these districts. By the morning of the 3d, the high-pressure area was over the southern Appalachian region and frosts were again reported in the east Gulf States and also in the South Atlantic States. During the next 12 hours, it passed eastward to the Atlantic Ocean.

On the morning of the 2d a low-pressure area appeared over Saskatchewan and moved thence in 24 hours to western Iowa, its axis extending northeast and southwest. By the morning of the 4th it was over Indiana with decreased intensity, and by the morning of the 5th its center was over Nantucket. Precipitation attending this storm was light.

Following its passage there was a slight reaction to higher pressure.

On the morning of the 4th a low center appeared over Saskatchewan and on the following morning a well-defined center was over Lake Superior, which by the following morning had passed eastward to Quebec. Storm warnings were ordered for the New England and middle Atlantic coasts on the morning of the 6th and during the succeeding 48 hours gales occurred over the territory indicated in the warnings. On the morning of the 7th the storm was near the mouth of the St. Lawrence River, with much increased energy. In connection with this storm precipitation was light and confined to the northern districts east of the Plains States.

Attending the appearance of a high-pressure area over the western Canadian Provinces on the morning of the 5th, temperatures had fallen to below zero. Cold-wave warnings were ordered for the northern portions of the upper Mississippi and Missouri Valleys, and temperature falls of 20° or more occurred within the succeeding 24 hours. By the morning of the 6th the high area had advanced to the southern Plains States and cold-wave warnings were disseminated for the Atlantic States north of Maryland, and marked changes in temperature occurred as indicated. By the morning of the 7th the high had passed to western Kentucky, causing frosts in northern portions of the east Gulf States and in South Carolina, warnings of which were previously disseminated. On the 8th the center was over New Jersey, pressure being also high over the east Gulf States, and frosts were again reported over the northern portion of the east Gulf States and in South Carolina. By the following morning the high area had passed to the ocean.

The low-pressure area that was over Saskatchewan on the 7th advanced to Alberta during the next 24 hours. By the 9th the storm had passed to Lake Huron with increased intensity and by the following morning to the Canadian Maritime Provinces. Precipitation was generally light and confined to northern districts.

Pressure was high on the north Pacific coast and by the morning of the 9th an extension was noted, reaching from that region to the southern Plains States. On the morning of the 10th a high, with inner isobar of 30.20 inch, which was over western Pennsylvania, passed during the 24 hours following to the ocean.

On the morning of the 9th pressure had fallen over Texas, and in consequence rains had occurred over the west Gulf States. By the morning of the 10th a low center had advanced to northern Mississippi, while the area of rains had spread northeastward to Tennessee and eastward to the Atlantic coast. By the morning of the 11th the low was off the middle Atlantic coast and during the next 24 hours passed rapidly northeastward. Rains occurred over the Gulf States, the Ohio Valley, and Atlantic coast districts, being heavy in portions of the Gulf States.

High pressure persisted on the north Pacific coast, and on the morning of the 10th a center of high pressure had appeared over Colorado. On the following morning it was over northeastern Missouri and 24 hours later was over the middle Atlantic seaboard. On the morning of the 13th it was off the New England coast with increased intensity.

Following the passage of this high eastward, pressure became low over the Middle and North Pacific States, and by the morning of the 11th a well-marked low was over Utah, which during the next 48 hours advanced to the Texas Panhandle. On the 13th storm warnings were disseminated for the east and central Gulf coasts and high winds occurred as indicated. Advisory warnings for high winds were also distributed for Lake Michigan and they occurred generally as forecast. Precipitation, which had been generally unimportant up to the morning of the 11th, had by the morning of the 12th spread over the west Gulf States and, when the storm was over Colorado on the following morning, the area of precipitation covered practically the entire country, except New England and the lower Lake region. By the morning of the 14th the low center had advanced to Iowa, with a barometer reading near its center of 28.86 inches, and by the 15th it was over eastern Ontario. Small-craft warnings were ordered for the Atlantic coast and brisk winds occurred over the region indicated. By the morning of the 16th the main center was near the mouth of the St. Lawrence River, with a secondary center over Rhode Island. During the 24 hours following the storm had passed from the field of observations. This storm caused precipitation from the Rocky Mountains to the Atlantic coast, being heavy over portions of the Gulf and middle Atlantic coasts. North of the storm center precipitation was in the form of snow, and in the Dakotas and portions of adjacent States rain and sleet, turning to heavy snow, interrupted traffic and caused some loss of stock on the ranges. Local storms occurred in portions of Georgia, Alabama, Mississippi, Arkansas, Iowa, Nebraska, Kansas, Missouri, Texas, Illinois, Tennessee, and Louisiana, causing considerable loss of lives and property.

High pressure continued on the north Pacific coast and by the morning of the 13th, at the time the low-pressure area previously mentioned was over the Texas Panhandle, it became high over the Canadian Northwest as well. Cold-wave warnings were distributed for eastern Montana, Wyoming, the Plains States, and the northern portion of Texas, and decided falls in temperature occurred over these districts. By the 15th pressure had become high over the Plateau region and by the morning of the 16th high centers were over the northern Plains and the west Gulf States, in which latter region frosts and freezing temperatures were reported, warnings of which had been previously issued. By the morning of the 16th there was but one center—over Kentucky—with a reading of 30.70 inches. This high area increased in intensity and on the following morning readings of 30.90 inches and over were reported on the middle Atlantic coast near its center. Frosts were reported over the northern portion of the east Gulf States. During the two days following the high remained off the middle Atlantic coast but with decreasing intensity. Notices of the decided changes to lower temperatures and the frosts which attended this high over the country east of the Rocky Mountains were disseminated previously to their occurrence.

The next low to cross the country, which was of north Pacific origin, made its appearance on the morning of the 17th over western Manitoba. By the morning of the 18th the main center was over southwestern Wyoming, while another center was over eastern Washington. By the morning of the 19th the main center was over Colorado with an extension northeastward into Minnesota. With the high pressure over the Canadian Northwest conditions were ideal for the heavy fall of snow that occurred over the northern Plains States and Montana. On the evening of the 19th the following special warning was issued to stations on Lake Michigan:

"High and dangerous northwest winds with snow and a cold wave."

By the 20th the center was over Lake Michigan and high winds and snow had occurred over that region. Storm warnings were ordered on the morning of the 21st for the Atlantic coast from Hatteras to Eastport and storm winds occurred during the succeeding 24 hours. By the morning of the 21st it had passed northeastward into Canada. Another low referred to as being over eastern Washington on the 18th was by the morning of the 19th over the northern Plateau and by the following morning over southwestern Colorado. By the evening of the 20th a storm center was over Arkansas and by the following morning over southern Lake Michigan, with pressure reading 29.02 inches at Notre Dame, Ind. Telegraph lines were prostrated and reports from west of the Mississippi River were not received at Washington that day. By the evening of the 21st the center was over eastern Quebec and by the morning of the 22d near the mouth of the St. Lawrence River. Advisory warnings of high winds and gales were issued for the Great Lakes and they were experienced at nearly all lake stations. Some of the highest winds of record were reported from stations on Lake Erie, as follows: Toledo, 84 miles southwest; Detroit, 86 miles west; and Buffalo, 90 miles west. Severe local storms occurred over portions of Alabama, Mississippi, and Arkansas, and high winds were reported generally throughout the Ohio Valley.

From the 18th to 20th pressure was high and stationary over the Canadian Northwest. By the morning of the 20th, however, the center had moved to Montana, carrying southward the zero temperatures that had prevailed over Canada. By the morning of the 21st the high was over eastern Montana and the Plains States, and by the morning following over Indiana, having caused decided falls in temperature over the Mississippi Valley. On the morning of the 23d it was over the southern New England coast with a pressure reading of 30.80 inches, and the following morning it had passed to the ocean. Over the Ohio Valley the changes in temperature accompanying this high pressure were somewhat delayed owing to the development of the storm that on the morning of the 21st was over southern Lake Michigan.

The next low to cross the country was also of north Pacific origin, first making its appearance on the evening of the 21st over Nevada, where it remained practically stationary for the 12 hours following, although increasing slightly in intensity. On the morning of the 23d it was over Colorado, while high pressure prevailed to the northward. On the evening of the 23d it was over

Iowa, a barometer reading of 29.28 inches being reported at Omaha. During the 23d storm warnings were ordered for the Louisiana and Texas coasts and on the evening of that day for the Atlantic coast from Cape Henry to Eastport, and high winds occurred as forecast. During the next 24 hours it advanced to Lake Superior and by the morning of the 25th was over the Grand Banks of Newfoundland. Precipitation attending this disturbance was confined to the Mississippi and Ohio Valleys and the Lake Region. Severe local storms occurred in portions of Kansas, Nebraska, Iowa, Illinois, and Indiana. Discussion of the tornadoes that visited Omaha, Nebr., and Terre Haute, Ind., follow at the end of this article.

The following extract from the weekly forecast issued Sunday, March 23, and referring to this storm, is worthy of note:

> The distribution of barometric pressure over the Northern Hemisphere is such as to indicate a continuance of abnormal storm activity and marked fluctuations in temperature in the United States the coming week. A storm central Sunday over the Rocky Mountain region will move rapidly northeast, accompanied by shifting gales; * * *

After the passage of this storm, pressure remained below the seasonal average over the southern Rocky Mountain region and Texas, while the high pressure area over the Canadian Northwest still persisted. On the morning of the 24th a low center was over western Colorado and another over western Texas. By the morning of the 25th the Colorado storm was central over northwestern New Mexico, while the Texas disturbance had advanced northeastward with increased intensity to a position over Arkansas, and another low had appeared over northern Ohio and western Pennsylvania. Pressure remained low over southern Texas, and storm warnings were ordered during the morning of the 25th for the Texas and Louisiana coasts and high winds occurred as forecast. During the afternoon of that day storm warnings were also issued for the Atlantic coast from Cape Hatteras to Eastport, and brisk to high winds occurred over that region. On the morning of the 26th low centers were over western New York, northern Louisiana, and the mouth of the Rio Grande and storm warnings were continued for the west Gulf and ordered on the east Gulf coast as far east as Cedar Keys. During the evening of that day warnings were ordered displayed on the Atlantic coast from Jacksonville to Eastport and were repeated on the 27th for the Atlantic coast from Hatteras northward. General gales occurred over the territory indicated in the orders. On the evening of the 26th a low was over Kentucky (probably the one that was over northern Louisiana on the morning of that day) with much increased energy. By the evening of the 27th there were two lows, one over western Maryland and the other over western New York. During the 24 hours following the storms passed to the mouth of the St. Lawrence River. This series of disturbances caused general precipitation in the form of rain and snow from the eastern slope of the Rocky Mountains to the Atlantic coast, heavy rains being reported in the Ohio Valley. In connection with these disturbances local storms were reported in portions of Arkansas.

The center of the high pressure area that had persisted over the Canadian Northwest was, on the morning of the 24th, over Alberta, accompanied by temperatures below zero. On the following morning it was over eastern Manitoba, carrying the line of zero temperature into North Dakota, Wyoming, and Montana. On the morning of the 26th the high, with axis east-west, was central over northeastern Wyoming, and the line of zero temperatures had advanced into South Dakota. On the morning of the 27th the high had passed to the west Gulf States, the line of freezing temperatures having advanced almost to the west Gulf coast and causing destructive frosts as far south as central Texas and thence eastward, except along the immediate Gulf and south Atlantic coasts and over the Florida Peninsula, and much damage is reported to have occurred to early fruit and tender vegetables despite the warnings. On the 28th the high was over western Kentucky, and frosts were reported over the northern portions of the Gulf and South Atlantic States, warnings of which were previously disseminated. By the morning of the 29th the center was over New England, and frosts were again reported over the northern portions of the Gulf and south Atlantic States and in Virginia. By the morning of the 30th the high had passed to the ocean. This high caused decided changes to colder weather over the great central valleys, and frosts in the Southern States, warnings of which were issued well in advance.

On the morning of the 27th storm warnings were ordered on the north Pacific coast, and during the ensuing 24 hours storm winds occurred in conformity with the warnings. The winds were due to the storm that was central on the morning of the 28th over Saskatchewan, with a trough extending into Colorado. By the morning of the 30th the center was over northern North Dakota with trough extending southward over the Plains States. A disturbance of ill-defined character had in the meantime appeared over southeastern Florida, causing rains over portions of the south Atlantic and east Gulf States. By the morning of the 31st the northwestern storm was over eastern Ontario, and the Florida disturbance had lost its identity in the trough which extended southeastward from the northern storm center to the Virginia coast. Storm warnings were ordered on the morning of the 31st for the Atlantic coast from Sandy Hook to Eastport, and during the 36 hours following storm winds and high seas occurred off the north Atlantic coast. The morning map of the last day of the month showed the center over Quebec. This storm caused precipitation from the Plains States eastward to New England. It was followed by a slight reaction to high pressure, and the evening map showed high centers of slight intensity over Missouri, South Dakota, and on the north Pacific coast, while low pressure prevailed over Quebec, the Southern Plateau, northeastern Texas, and Alberta.

THE OMAHA TORNADO, MARCH 23, 1913.

The tornado that passed through the city of Omaha on the evening of Easter Sunday, March 23, 1913, was undoubtedly the most destructive to life and property that ever occurred in the Missouri Valley and probably one of the most destructive in the history of the country. The storm attended by the pendent funnel-shaped cloud first struck the city at its extreme southwestern limit, Fifty-fourth and Frances Streets, and its track extended from that point northeastward across the western and northern portions of the city to Cut Off Lake, which is located near the Missouri River and in the extreme northeast portion of the city. The length of the tornado path between the points named was about 5 miles, and its width varied from one-fifth to one-fourth of a mile. The length of time consumed in the passage of the tornado across the city can not be exactly ascertained, but it is believed to be about 12 minutes. The funnel cloud crossed Fortieth and Farnam Streets at 5.49 p. m., and Twenty-fourth and Lake Streets at 5.55 p. m., having